FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

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Sept. 3–4	Belgian Competitions (Brussels)
Sept. 4–11	Brescia Races
Sept. 10	Pulitzer Trophy, Detroit, U.S.A.
Sept. 18	Gordon Bennett Balloon Race, Brussels
Sept. 25–Oct. 2	Aero Exhibition, Prague
Oct. 1	Coupe Deutsch de la Meurthe
Nov. 3	Lecture, "Manœuvres of Getting Off and Landing," by Sq. Ldr. R. M. Hill, before R.Ae.S.
Nov. 12–27	Paris Aero Salon
Nov. 15–26	International Air Navigation Congress (Paris)
Nov. 17	Lecture, "Requirements and Difficulties of Air Transport," by Col. F. Searle, before R.Ae.S.
Dec. 1	Lecture, "Design of a Commercial Aeroplane," by Capt. G. de Havilland, before R.Ae.S.
Dec. 15	Lecture, "Development of the Fighting Aeroplane," by Capt. F. M. Green, before R.Ae.S.

EDITORIAL COMMENT

THE ultimate fate of the airships appears still to hang in the balance. The Conference of Imperial Premiers passed a very tentative resolution regarding the proposal to use them as a means of speeding-up Empire communications, and all that can be said for the moment is that the ships are not to be disposed of in the meantime, but are to be retained at least until such time as the Dominion Governments have had time to examine the possibilities and the finance of the proposals which have been put forward for the use of these craft. The resolution reads: "The Conference, having carefully considered the Report of the expert sub-committee on Imperial Communications, are of opinion that the proposals contained therein should be submitted for the consideration of the Governments and Parliaments of the different parts of the Empire. On the understanding that the cost involved will be in the region of £1,800 per month, they recommend that, pending such consideration, the existing material, so far as useful for the development of Imperial air communications, should be retained."

The Airships and Their Fate

The Report of the sub-committee is to be published later on as an appendix to the Blue Book containing the full reports of the proceedings of the Conference. In a matter of urgency such as this, and in order that those most closely interested may be able to appreciate the reasons actuating past and future airship policy, it would seem to us that the proper manner of dealing with it would be to issue the Report as a White Paper forthwith. We trust that the Parliamentary Air Committee will move for this, and will exert all possible pressure in order that it may be forthcoming at the earliest moment. There is no reason why it should not be and every good reason to be advanced for this course.

The decision to which we have referred has reference only to the ships themselves and such material and spares as may be necessary to commission and keep them running. The *personnel* are to be incontinently scrapped. Officers and ratings of the R.A.F. which had been lent to the Civil Dept. are to be absorbed into other branches of the Air Force,

while the civilian staff, who were all serving on temporary engagements, have been given notice or are to receive notice terminating their services. It is to be hoped that the economy axe is not being wielded too vigorously, and that the officers who have made airships their especial study during and since the War, and who have been retained up to now in the airship service, will not be allowed to drift into other occupations so that, if it is decided to open up Imperial airship routes, they will not be available for the work. This is really a rather serious matter. According to Mr. Churchill, these officers are to be "absorbed" within the Royal Air Force, but the question arises of whether or not they will desire absorption. Specialists in airship work, whether as pilots or otherwise, they will undoubtedly be at a serious disadvantage when drafted to aeroplane stations, and, whatever their rank or experience, will virtually have to start at the beginning again. Coming from a branch of the Service which has ceased to exist, the chances will be all against them in the matter of promotion, and we can very well see that the best of them may prefer to leave the Service altogether rather than face a future so indeterminate. How long will it take the Dominion Governments to make up their minds in the matter? Not more than three months, surely. Considering the importance of the issues involved, we should say it was probably the truest economy to keep the existing staff together, pending decision, and not to be in too much of a hurry to "absorb" them.

Aircraft and the Navy

During the Committee stage of the Naval Estimates some very interesting statements were made regarding the co-operation between the Royal Air Force and the Navy. Some of them are likely to cause very serious thought and some amount of consternation to those who, pinning their faith to the principle of a separate and distinct Air Service, had thought that the basis of co-operation with the two older Services had been properly worked out and was being carried on with the requisite smoothness and efficiency.

Rear-Admiral Sueter, who was Director of the Air Department at the Admiralty during the early part of the War, was exceedingly caustic regarding the alleged shortcomings of Air Force units operating with the Navy. He said that Mr. Churchill has had a great deal to do with the Royal Air Force, but that he has turned it into an Air Military Force, which is being developed exactly like a Guards regiment, but that it is of very little use to the Navy. He went on to say that in some combined manœuvres the other day the airmen carrying out the operations with the Fleet could not place the battleships, and when they signalled the position of a submarine and it was put on the chart, it was not in the sea at all, but at Dorchester. That, said the gallant Admiral, is not what is wanted in the Navy. We must train our naval airmen to work with the Navy—the air navy and the water navy must work together.

Coming from such a source as Admiral Sueter, these criticisms and allegations of inefficiency—for they are no less—are exceedingly serious. They could not be more so. Had the critic been anyone else we might have thought that he was identified with the school of thought which is all in favour of going back to what we still believe to be the bad old principle of two separate Services, which was tried and found wanting during the War. But we have every confidence that if Admiral Sueter was in favour of reverting to the old condition he would have said so. He would not merely have contented himself with putting the matter with such comparative mildness, and would have gone much farther than merely saying that we must train our naval airmen to work with the Navy.

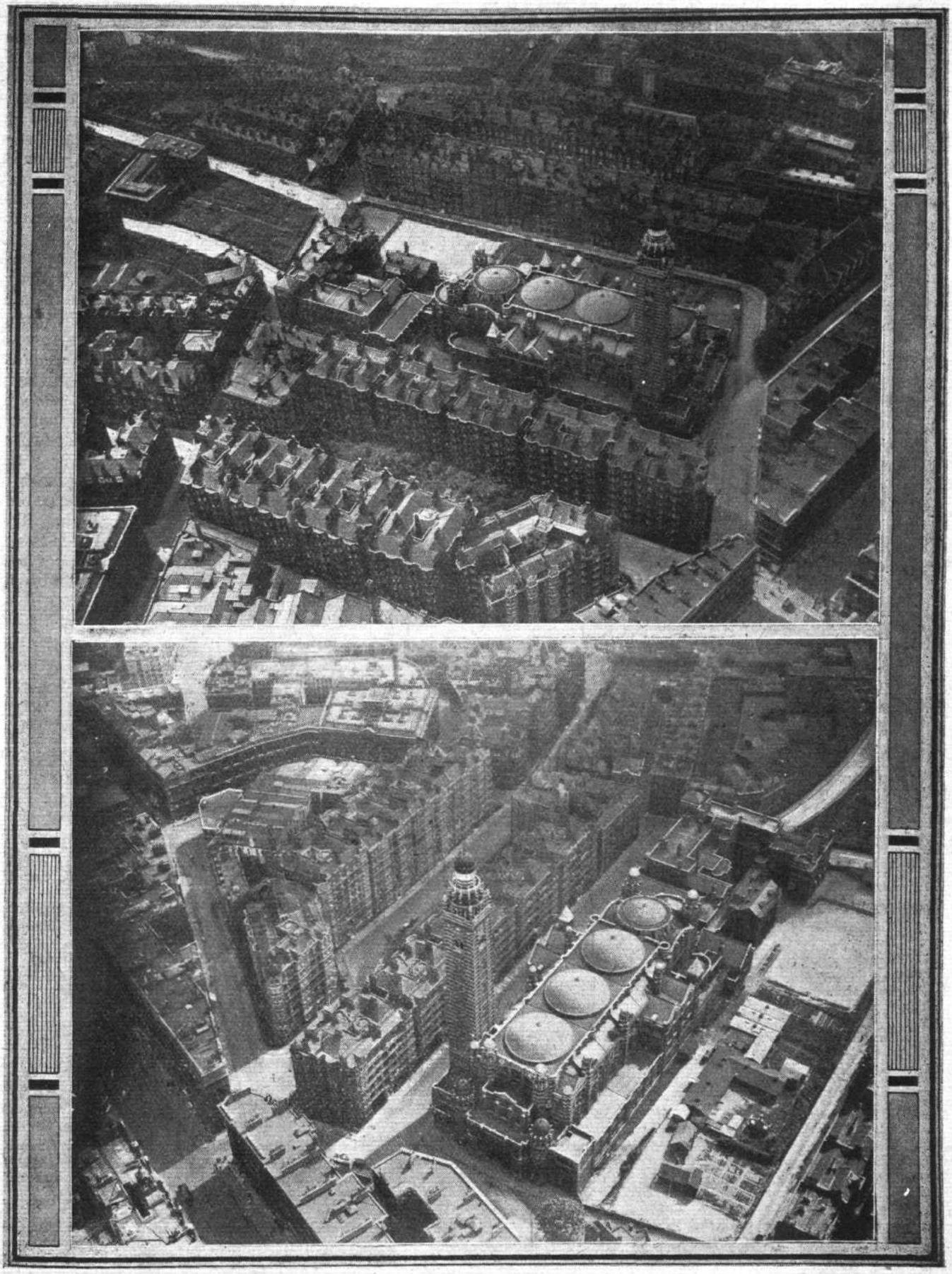
If such things as we have recorded do happen—and the instance given is specific enough—it stands to reason that there are very serious faults in the training of the *personnel* allotted to the Navy, and it will be well if the matter of who or what system is responsible is probed to the bottom. What is the system? We know that Naval aircraft are under the Naval commander-in-chief for command purposes, but are not at all clear whether the Navy interests itself in the training of the flying officers who work with the Fleet. Is the Air Ministry responsible for seeing that units detailed for Fleet work are properly trained for it, or are they simply put through the ordinary courses of what Admiral Sueter would probably call the Guards' routine of the R.A.F., leaving the rest to luck and the Navy? There is a screw loose somewhere that such things can happen, and we hope Admiral Sueter will, on a suitable occasion, secure a statement from the Air Minister as to the course followed.

The Upper Air

The first meeting of the International Commission for the Exploration of the Upper Air was held at Bergen during the last week of July. This Commission is to carry on the work of the international committee appointed at Petrograd in 1896, and which was interrupted by the outbreak of the War. In the interval it had accomplished a good deal of very useful work. The methods adopted consisted of sending up kites and balloons carrying self-recording barometers and thermometers, and particularly of free unmanned sounding balloons which explored the atmosphere up to heights of 15 miles or more. Some important discoveries were made as a consequence. One was that the earth's atmosphere is divided into two distinct parts, the troposphere which extends from the ground up to six or seven miles, and the stratosphere which lies above it. In the former, temperature falls with height; in the latter it appears to remain constant at any one time or place.

Quite the most interesting theory advanced during the Bergen conference was that of the "Polar front," by Professor Bjerknes. This theory supposes that a mass of cold air exists over the Poles. In a wavering line around the temperate zones this cold air meets the warm air from the equatorial regions, and all along the line of contact the warm air rises over the cold, with a resultant series of waves, in connection with which what are known to meteorologists as "depressions" arise. In a word, the "cyclone" and the anti-cyclone are caused by the battle between the two opposing masses of cold and warm air. The author of the theory urges the establishment of a closely set chain of observation stations right round the earth in what he calls the "zone of struggle." The Commission actually formulated a scheme, which is to be referred to the International Meteorological Committee when it meets in London next month.

A very few years ago this most interesting theory



LONDON-PARIS FROM THE AIR, FROM A HANDLEY PAGE MACHINE: No. 6.—Two views of the Roman Catholic Cathedral, Westminster, and the surrounding streets.

of weather origin, as it may be called, would have been of little more than academic interest. In an era in which we look forward to the world-wide establishment of aerial communications, it is of the highest importance that meteorological science should be enabled to advance with as much rapidity as possible. To know the causes of the changes of weather conditions to which the earth is subject is to have travelled very far along the road towards being able to forecast them with comparative certainty, and it is upon this ability to foretell the weather conditions which will exist during a given future period that very much of the success of aerial navigation must depend. The theory, therefore, is of the greatest practical as well as scientific interest, and should be investigated as speedily and thoroughly as possible—assuming that it is practical to verify or disprove it.

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Royal Aero Club Activities

It is announced in the official notices issued by the R.Ae.C. that, subject to the consent of the Air Ministry, a race meeting will be held at the Waddon Aerodrome on one of the Saturday afternoons next month. The races will be over a circuit of about ten miles, so that the competing machines will be in complete view from the aerodrome during the whole time they are in the air. It is hoped to arrange races for all types of machines, and the Club is allocating a sum of about £500 in prizes.

We commend the Club for its enterprise in this direction, not only because of the sporting interest it creates, but by reason of the fact that all such meetings and events serve to familiarise the public with aviation and to focus the attention of the man in the street upon its possibilities. This last is a point of view which we have always insisted upon as being of the utmost value to the movement. Publicity is the life-blood of any industry. Without it, enterprise must die of sheer inanition. If this is true of any business or industry, it is doubly so in the case of aviation, which depends for its success upon becoming one of the commonplaces of transport, so to say. The public must be familiar with it, and must gain confidence in the aeroplane as a passenger-carrying machine. Nothing is so likely to create that confidence as the constant sight of aircraft in the air, while the fact that these last are engaged in a sporting contest focusses attention upon them as nothing else will. This is a point of view which cannot be too well appreciated, and it is because we realise how much these sporting events can do for the movement that we have such a profound belief in them.

Another direction in which the Club is showing commendable activity is in the latest arrangements it has made for machines to be at the disposal of members for business or pleasure flights. Very few can afford to purchase and maintain aeroplanes of their own, but many experienced pilots would be only too glad to have facilities for practice flights. This the Club is giving them, and at a price which is not at all prohibitive. An inclusive charge of £3 per hour seems to be quite on the moderate side. Undoubtedly the Club is doing quite well.

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THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN JULY 31 AND AUG. 6, INCLUSIVE

Route‡	No. of flights*	No. of passengers	No. of flights carrying: Mails	No. of flights carrying: Goods	No. of journeys completed†	Average flying time	Fastest time made by	Type and No. (in brackets) of Machines Flying
						h. m.		
Croydon-Paris	42	220	10	20	42	2 58	Breguet F-ADBO (2h. 20m.)	B. (5), Bt. (1), D.H.9 (1), D.H.18 (2), G. (1), H.P. (2), Sa. (1). Sp. (5), V. (1).
Paris-Croydon	43	215	16	29	37	3 21	D.H.18 G-EARO (2h. 21m)	B (6), Bt. (1), D.H.18 (2), G. 4. H.P. (2), Sa. (1), Sp. (6), V. (1).
Croydon-Brussels ...	7	17	5	5	7	2 32	D.H.4 O-BALO (1h. 45m.) ...	D.H.4 (2), D.H.9 (1), G. (1).
Brussels-Croydon ...	7	20	6	6	6	4 30	D.H.9 O-BEAU (3h. 14m.) ...	D.H.4 (2), D.H.9 (1), G. (1).
Croydon-Amsterdam ...	5	3	4	5	5	3 44	Fokker H-NABQ (2h. 51m.)	F. (4).
Amsterdam-Croydon ...	6	7	6	5	5	5 8	Fokker H-NABK (4h. 30m.)	D.H.9 (1), F. (3).
Totals for week ...	110	482	47	70	102			

* Not including "private" flights. † Including certain journeys when stops were made *en route*.
‡ Including certain diverted journeys.

Av. = Avro. B. = Breguet. Br. = Bristol. Bt. = B.A.T. D.H.4 = De Havilland 4, D.H.9 (etc.).
F. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. M. = Martinsyde. N. = Nieuport.
P. = Potez. Sa. = Salmson. Se. = S.E.5. Sp. = Spad. V. = Vickers Vimy. W. = Westland.

The following is a list of firms running services between London and Paris, Brussels, etc., etc. :—Co. des Grandes Expresses Aériennes; Handley Page Transport, Ltd.; Instone Air Line; Koninklijkie Luchtvaart Maatschappij; Messageries Aériennes; Syndicat National pour l'Étude des Transports Aériens; Co. Transaérienne.

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Advertising German Air Mail Services

THE Stuttgart postal authorities have recently brought in a new regulation as a means of propaganda for the Stuttgart--Constance-Switzerland air mail service. Between June 15 and July 30 letters were carried by way of experiment on the route in question at the ordinary postal fees, the usual additional air mail fee not being required.

The service was carried out in such a way that express matter received precedence over other matter for transport by aircraft. Bundles of printed matter and newspapers and other cumbersome postal matter, with the exception of express matter, were ruled out.

Two-thirds of the mail in question were forwarded by air, and one-third was held back and despatched in the usual way. By this means the Stuttgart postal authorities hoped to bring home to the public, who are in the habit of sending their mail by the usual channels, the advantages of the air mail service. The usual air mail matter—that for which the additional air mail fee has been paid—naturally received precedence over other matter.

FLIGHT

THE 300 H.P. BENZ AIRCRAFT ENGINE*

By Dr. A. HELLER

THE following description of the Benz 12-cylindered engine is a final example of the extensive development of aircraft engine construction in the German Empire. During the last few years, the firm of Benz has evolved this type of engine, which was first designed and constructed towards the end of 1914, but which was then temporarily set aside for the time being in favour of the simpler six-in-line construction, because of the urgent need for standardising aircraft engines.

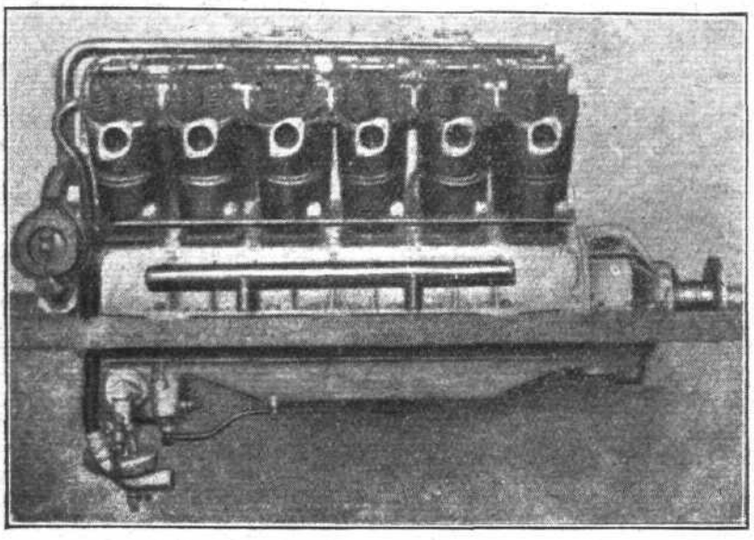


Fig. 1.

The latest 300 h.p. aircraft engine, with its 12 cylinders placed at an angle of 60° (Figs. 1 to 6), not only realises a long-cherished conception, which had been amply tested from a constructional point of view, but has also received such refinement in detail due to the extensive working experiences of the last few years that it may be described as a perfect example of modern German aircraft engine construction. Such being the case, a detailed description of the development of the constructional points of the engine may be justifiable, as given below.

The engine has 12 cylinders of 135 mm. bore amd 150 mm. stroke. Each pair of cylinders serves one of the crank-pins of the six-throw shaft, and the engine normally produces 300 h.p. on the ground, at 1,800 r.p.m. with the carburettor at full throttle—which is only possible temporarily; and under the same conditions at 2,000 r.p.m. the engine develops 400 h.p. The engine is a so-called "altitude" engine, its decrease of power with diminishing air density being compensated by over-dimensioning the cylinders and over-compressing up to a certain altitude. A normal propeller is driven by means of a rotary reduction gear mounted on the crank-case, the gear ratio being 29 : 19. Its weight without water, oil charge, propeller boss, ignition magneto and the engine exhaust manifolds is about 430 kg., which would be about 1.43 kg./h.p. as relative to normal power on the ground.

The construction of the cylinders (see Figs. 7 and 8), which are interchangeable and are set comparatively deep in the crankcase in order to diminish the width of the engine, is especially characterised by the use of inner cylinders made of forged steel and screwed into a cast-iron cylinder head (Figs. 7, 9 and 10). To prevent the possible penetration of cooling water into the combustion-chamber at the screwed connection of these two parts, the top rim of the steel cylinder liner is jammed into a groove in the cylinder-head when screwed down, the cylinder head being bent slightly outwards so that the top rim of the steel tube is turned up sufficiently for it to press firmly against the side of the groove. In screwing it on, the cement filling of the groove is squeezed out through minute holes bored for the purpose. The bushings of the spark plugs are screwed into the upper part of the steel sleeve, and then autogenously welded to ensure perfect tightness at those points. When the cylinder has been tested at 30 times the working internal pressure, it is fitted with a water-cooling jacket made of sheet steel from 1 to 2 mm. in thickness. This cooling jacket is autogenously welded to the steel sleeve as well as to the cast-iron cylinder head. Experience shows that there is no difficulty in welding sheet steel to cast-iron.

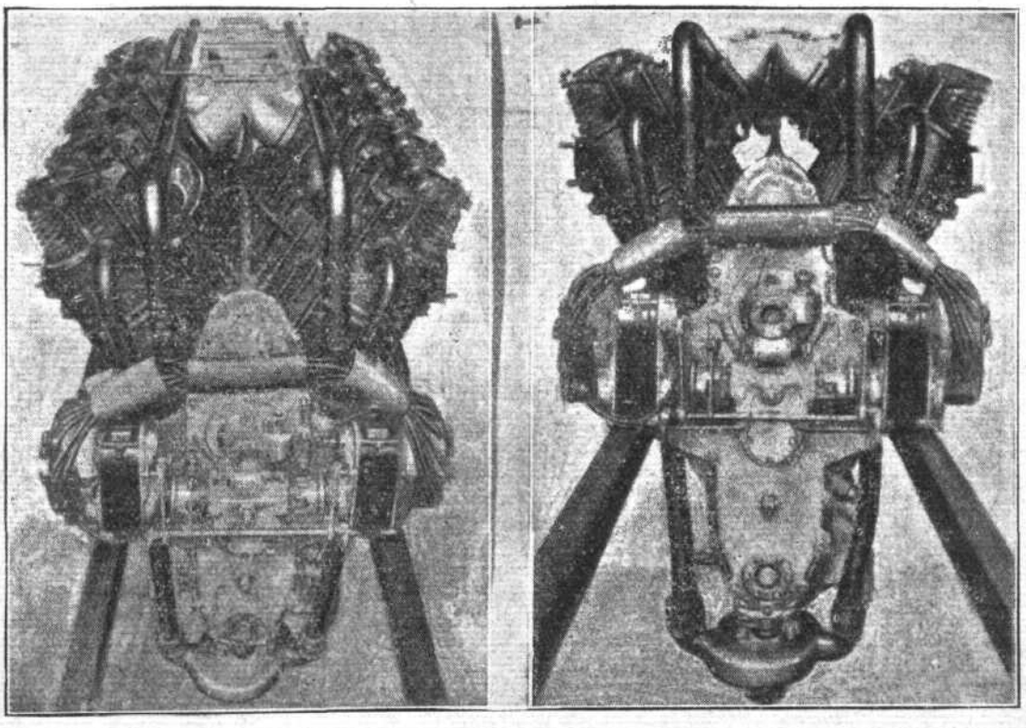


Fig. 2.

Fig. 3.

Benz and Co. have been comparatively slow in adopting the use of steel cylinders in aircraft engines and thereby ensuring a considerable saving in the weight of the engine. This may be traced to their desire to avoid the decreased reliability entailed in working with steel cylinders when cast-iron pistons were used. Even when such pistons were plentifully oiled and carefully measured for compression conditions, they showed a tendency to cause excessive friction, and this

* Technical Note No. 34. Translated from *Zeitschrift des Vereines Deutscher Ingenieure*, by Paris Office, N.A.C.A.

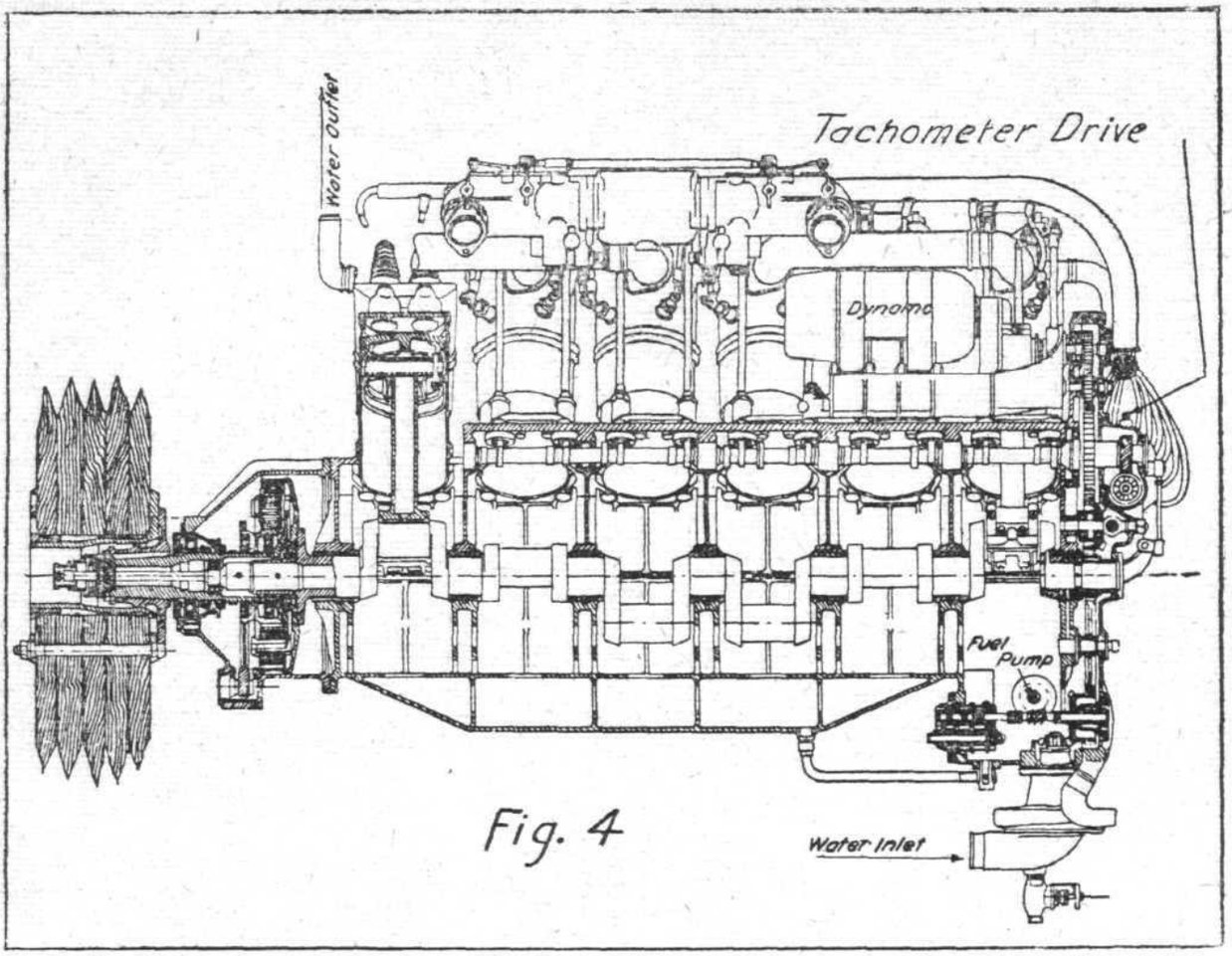


Fig. 4

was really satisfactorily overcome only when each piston was separately ground into its own special cylinder. This is a process which would seriously hamper production, and would render it almost impossible for a piston to be changed in the course of service. When aluminium alloy pistons were introduced, Benz and Co. immediately adopted the use of steel cylinders.

The cylinders are fixed on the specially adapted roof-like milled top side of the crankcase, each with 4 screws placed as close as possible to the axis of the cylinder. The cylinder flanges, which are comparatively large in size, are milled as far as possible with a view to economising in weight. The cylinder heads are so closely jammed against the ends of the water-jacket sleeves that they can be made sufficiently tight by means of simple rubber rings covered with sheet-steel washers (SKF Schellen). This tightness has been maintained even when the rubber washers were of rather poor quality.

The cylinders are served by a large intake valve and two small exhaust valves (Figs. 11 and 12), by which means there

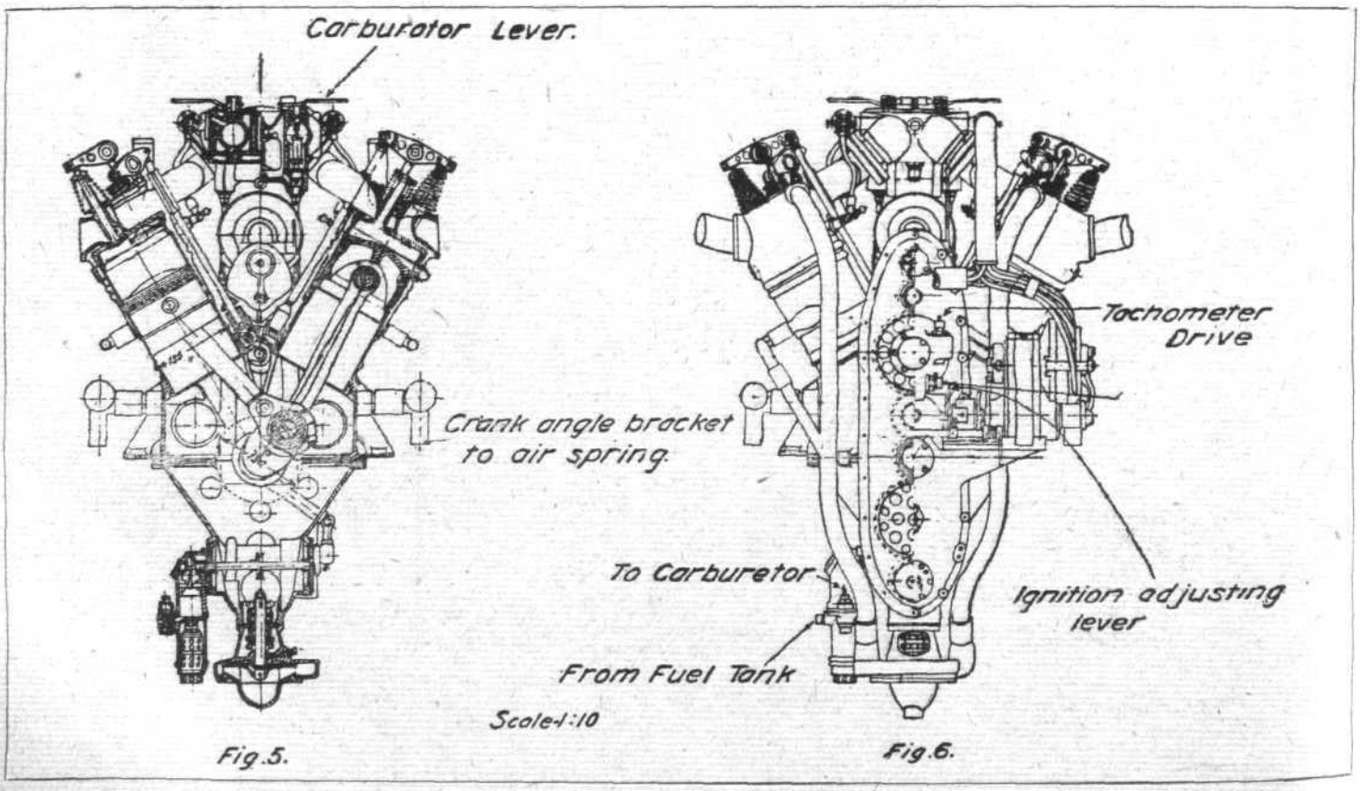
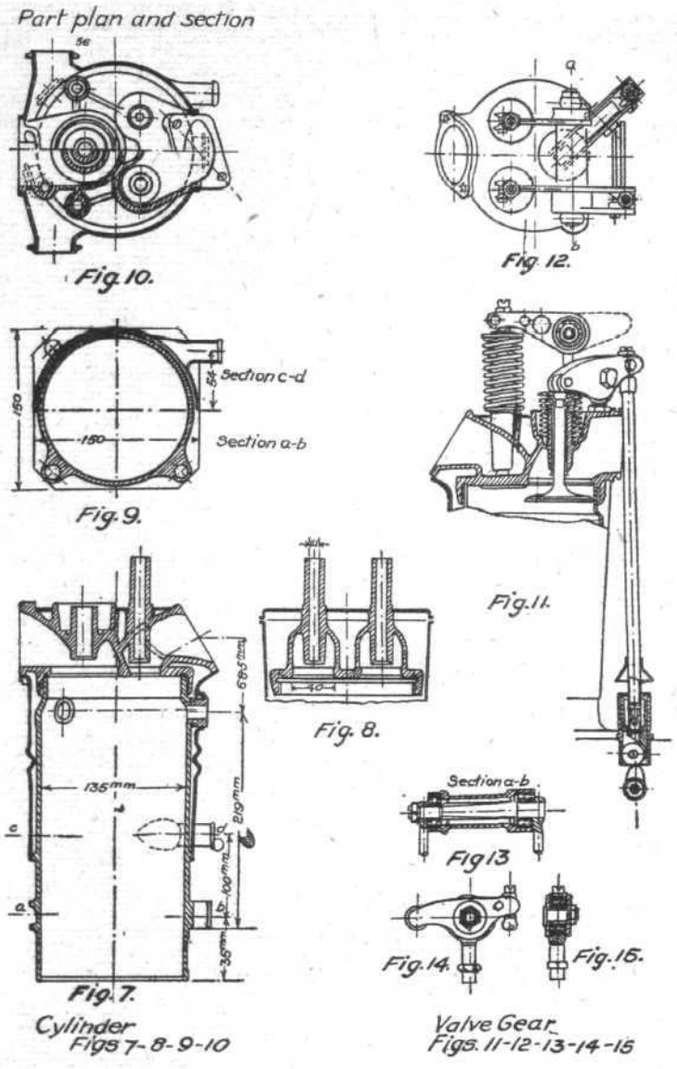


Fig. 5.

Fig. 6.



Figs. 7 to 15.

is no danger of the deformation of the exhaust valve at high temperatures. All the valves are operated by a camshaft located between the two rows of cylinders by means of push rods and single and double rocker arms (Figs. 11 to 15). These rocker arms are all mounted in ball bearings. The camshaft, with its five bronze bearings, can be drawn out with the bearing when the guides of the push rods are removed and the screws of the camshaft bearing loosened.

Double springs of very low constructional height being used for the intake valves and partly sunk in the cylinder heads, the valve rocker of the intake valve can be brought obliquely under the double rocker of the exhaust valves, and the push rods are thereby kept at the requisite distance from one another and from the cylinder heads. The entire construction of this mode of valve-operation, as compared with the usual method using special casing with enclosed camshaft on top, is marked by the relatively easy accessibility of the valves, springs and rockers, and the facility with which the valve rocker bearings can be lubricated. The ball-bearing of the valve rockers, filled with lubricant only when the engine is built or thoroughly overhauled, actually needs no further oiling. This type, which was first introduced in the Imperial Prize Engine, in 1912, has so well proved its worth that the use of ball bearings has been adopted for the valve rockers of other engines with the camshaft located below.

In operating, attention must be given to the necessity for leaving a play of about 0.4 mm. between the valve stem and the valve rocker tappet pin when the engine is cool, so that the valves may be thoroughly closed by the time the engine is warm. Special importance must also be attached to there being a similar amount of play for all the collectively-driven exhaust valves. Each of the valve-stems is connected with the valve spring by a two-part cone. This cone is located in one of the grooves of the valve stem, and is held fast by the pressure of the spring.

As the valve stem heads are tempered, the edges of the groove must not be hard enough to cause scratching. To prevent the valve from falling freely into the cylinder in case of breakage of the valve spring, and thereby doing great damage, the cone is held in the spring collar by an expanding ring. A former method of locating the valves in an extension of the cylinder-head, in such a manner that they could not fall through, has been almost entirely abandoned on account of the difficulties involved in the interior structure of the valve, and furthermore, as it ensures so little security from damage, the valve-collars alone being often wrenched off, in which case there is no way to prevent falling.

The push rods are lengths of seamless steel piping with rounded wooden pegs fastened with pins at both ends. The force of the valve springs alone holds them between the valve tappets and the rocker, and they can therefore easily be taken out if necessary.

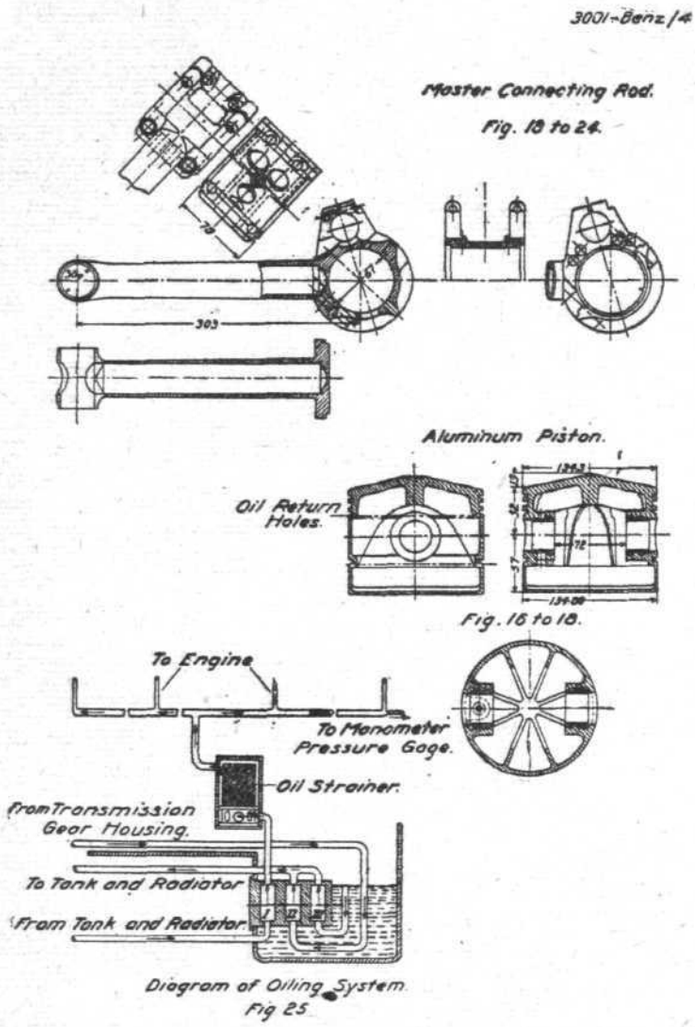
The construction of the pistons (Figs. 16 to 18), which are made of the usual aluminium-copper-zinc alloy cast in an outer chill-mould with an inner sand-core, is characterised by tubular steel bushing, cast in the piston pin bosses. By means of these bearings, it is also possible to give considerable length to the connecting rod bearing on the piston pin. The piston pins are open at the ends, and are secured laterally by conical pegs which enter the eyes from below. The drag weight of the piston, as influenced by friction, can be compensated within a few grammes by an oil drip ring on the lower interior rim of the piston. By this method, a piston of any series may be built into the cylinder of an engine without disturbing the compensation of the whole. The pistons are fitted into the cylinders by four small high-rimmed cast-iron washers. For aluminium pistons, much depends upon this jointing, as they require a comparatively large amount of play when fitted into the cylinder, on account of the great expansion of the jointing due to heat.

The use of aluminium pistons is one of the progressive steps of later years both from a thermo-technical as well as a purely practical point of view, and they are now regarded as a useful factor in the technics of power-propelled vehicles of the future. Their use is attended by many practical advantages, especially with regard to economy in the wear of the cylinders, which do not, even after many years' wear, need to be reground as at present. Should the pistons become worn, for instance, from insufficient oiling, not the cylinders but the pistons only would be affected, and the latter are far more easily renewed. One of the strongest arguments against the general use of engines with welded cylinders is thus done away with. From a thermo-technical viewpoint, the good heat-conducting properties of aluminium are an advantage on account of the comparatively low temperatures that always prevail on the upper side of the piston wall, and which can be detected by the absence of fused oil residue. This prevents the seizing of the piston rings by fusion, which frequently causes derangement when cast-iron pistons are used. It has been repeatedly proved that the power of an engine can be raised 10 h.p. with a certain number of revolutions and under other similar conditions, by the installation of an aluminium piston. Mean effective piston pressures of 9 atm. or even more can also be obtained on high speed engines without any hardness or jolting in running, and all these advantages are due to the good heat-conducting quality of the piston. The comparative coolness of the top side of the piston prevents the intake mixture from heating too rapidly, and thereby improves the cylinder charge, while the degree of compression ratio that can be attained without risk of spontaneous combustion is greater, and the highest possible mean piston pressure is attained later with aluminium pistons as compared with cast-iron. Taken as a whole, the saving in weight by the use of aluminium pistons applied to automobile engines rather than aircraft engines is no more than cast-iron, as the short pistons of the latter require the addition of ribs for stiffening.

The structural formation of the master connecting-rod (Figs. 19 to 24) is remarkable for the successful location of the joint of the crankpin end, which is as far as possible from the immediate influence of the forces acting from the piston, and also because the screws securing the crankpin end are so precisely threaded as to lessen the risk of their shearing. This does not obviate the need of using studs for the connection on one side, although blank bolts that could be pushed through would be preferable. The bolt or pin connecting the secondary rod to the master rod, is securely held in a clamp-bearing. Bronze bearings are used between the secondary connecting-rod and the bolt and the usual bronze cap white metal bearing on the crankpin for the master-rod. The stems of the connecting-rods are round, and are bored from the piston end in order to ensure a tubular cross-section specially capable

of resistance to bending, and inside which the oil channel leading to the piston-pin can easily be located.

The engine fittings are arranged on the principle that the comparatively inaccessible end at the propeller should be left as free as possible when the engine is mounted on an aeroplane. On the other hand, the constructional length of the engine should be curtailed as much as possible, in order to avoid any detrimental influence on the turning ability of the aeroplane. For the same reason, the carburettors, which are joined in couples each supplying three cylinders, and the magneto driven by the camshaft are located in the space between the cylinder rows, while the spark-plugs, with the pumps for fuel, oil, and water, are placed at the rear end of the engine within reach of the pilot's seat.



Figs. 16 to 5.

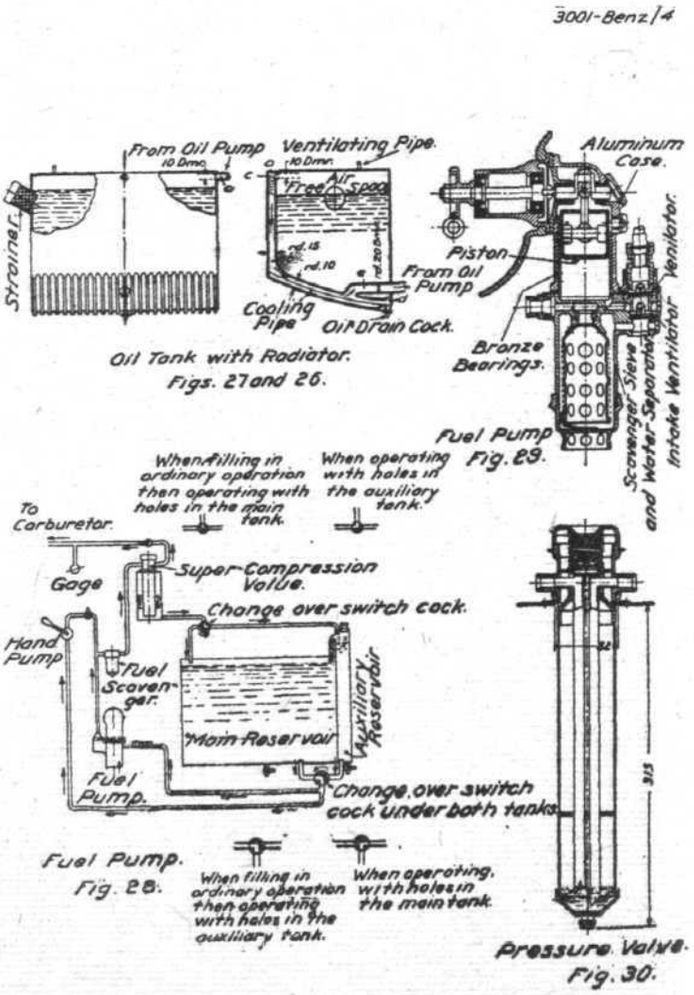
In lubricating the engine, the process of continually adding small quantities of fresh oil to the ever-circulating oil has been replaced by simple rotary lubrication ; the piston pumps formerly used are now replaced by gear-wheel pumps, which are far more easily driven and are of simpler construction. The former prejudice against simple rotary lubrication, based on the more rapid wearing of the crankshaft bearings through carbon and metal dust impurities in the oil, has been proved to be unjustified in experiments made with power-impelled vehicles, while in the case of aircraft engines, in particular, the frequent renewal of the entire oil supply must be taken into account. As applied to gear-wheel pumps, its reliability was at first considered doubtful, as the gear-wheels must be caulked at the sides in the case, and the caulking cannot be replaced later. Experience has shown, however, that the gear-wheel pump supplies sufficiently high oil pressure even after long usage, and that it never loses its tightness to such an extent as to allow the oil to flow back into the crankcase out of the oil reservoir through the pump-case when the engine remains stationary for any length of time, and by so doing to involve difficulties at starting. A safety device, specially constructed to remedy that defect, consisting of a piston kept open by the oil pressure and weighed down by a spring, can therefore be dispensed with.

The triple gear-wheel pump located at the lowest part of the crankcase consists of three separate pumps (Fig. 25), one of which (I) drives the oil through a nozzle collector into the distribution piping, which is installed on the outside of the crankcase, and is therefore easily accessible for cleaning purposes (Fig. 1). This method of installing the distribution piping is now preferred to that of locating it in the crank-case and connecting it with the bearings by transverse boring, experience having proved that cast aluminium has a strong tendency to become porous when the distribution pipe leads into it, and that the boring in question soon loses its tightness.

From the principal bearings, the oil flows under pressure, through tubes bored in the crankshaft, to the crank-pin end, then through the tubular interior of the connecting-rod to the piston-pin, which is hollow and thus distributes the excess of oil on the inner surface of the cylinder swept by the piston. The regularity of the lubrication functions is checked by a manometer at the distribution piping, the pressure of which should never be lower than 0·5 atm.

Two more oil pumps (I and II) draw off the oil used in the engine, to the front and rear ends of the crankcase, and force it back into the oil-tank. This prevents the oil from collecting at one end of the engine during the climb or in the course of a nose dive, and also from oiling the cylinder excessively.

A method proposed by Benz and Co. for the construction of the oil tank is shown in Figs. 26 and 27. Its corrugated outer wall forms a part of the *fuselage* covering, and is therefore effectively cooled by the wind caused by flight. The oil first enters at *a* by means of a partition wall, and reaches the jacket *b* of the tank, where it is strongly cooled. If the jacket is full, or coated with congealed oil through intense cold, the oil passes through the projecting rim *c* into the interior of the tank, from which it can flow, in turn, through the aperture *d* into the piping leading to the oil-pump. The tank must be provided with a ventilating orifice of about 5 c.m. in widt h



Figs. 26 to 30.

so located that the oil cannot run out either in climbing or in steep gliding flight.

A horizontal sheet-iron collective piping is attached to each of the oil vapour exhaust pipes (Fig. 1) in order to carry off the oil vapour from the crankcase. From them, the vapour is carried downwards and into the open air by means of pipes

fitted with oil-receptacles, cut off obliquely at the open ends in such a manner that the sucking effect of the wind created by flight can be utilised at will.

The fuel installation (Fig. 28), which has been constructed on lines conceived after many years of practical experience, consists of a principal reservoir, *a*, with an auxiliary reservoir, *b*, built beside it, a fuel-pump, *c*, worked by the engine, a hand-pump, *d*, with a fuel scavenger, *e*, and super-compression valve *f*, in the pressure pipe of the pump; from valve *f*, the feed-pipe equipped with a manometer, *g*, is conducted into the carburettor. The principal reservoir is filled with fuel from the auxiliary tank, and is likewise under pressure of the outside air, so that in case of damage by gunfire, or similar cause, it cannot discharge its contents too quickly. If the contents of the principal tank have run out, however, a safe landing may be effected by means of the contents of the auxiliary tank, as the fuel pumps can be fed by either tank. The amount supplied by the fuel pumps is considerably greater than that required by the engine. The surplus passes through

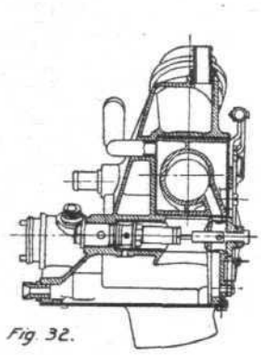
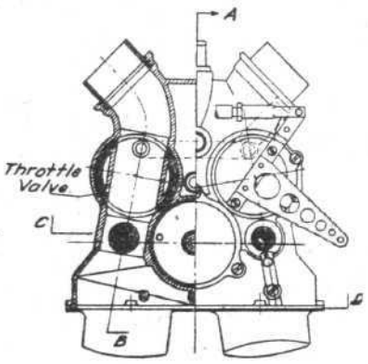
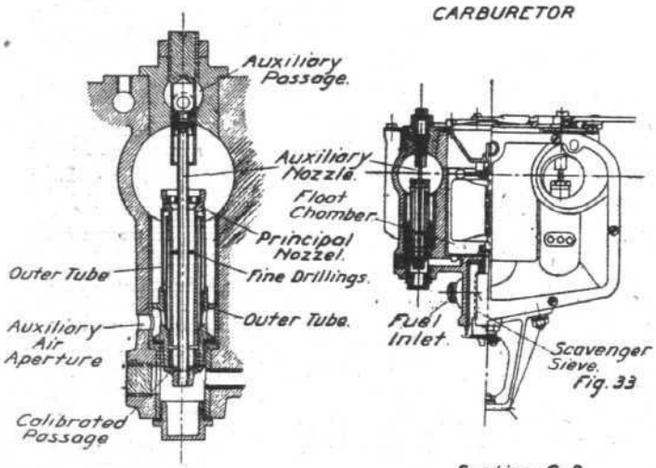


Fig. 32.



Section A-B. Fig. 31.

CARBURETOR



Section of Jet Control Valve

Section C-D.

Fig 34

to 34.

supercompression valve *f* into a receiver, from which it either flows back into the auxiliary tank or into the principal tank, according to the manner of its adjustment. This disposal of the fuel leaves each fuel pump free to act independently of the other, the functioning of the whole being thus assured even when the engine pump may be out of order. The fuel is therefore always supplied to the carburettor under constant super-compression, in which respect it has the advantage over the ordinary device with auxiliary tank, in which the fuel pressure at the carburettor varies considerably in accordance with the angle of the aeroplane and the building-in of the auxiliary tank.

The fuel pump (Fig. 29) consists of an ordinary piston-pump with an aluminium case, *a*, bronze bearings, *b*, and slightly adjusted piston, *c*, to which the fuel flows over a combined sieve-scavenger and water separator, *d*, the bottom of which can be unscrewed, and an intake ventilator, *e*, borne down by its own weight. The pump is slowly driven by the control-wheels of the engine, by means of a transmission screw. In its original form, as used on the 220 h.p. aircraft engine, it was worked with glycerine as auxiliary fluid. Duration tests soon prove, however, that there is perfect safety in working even when the piston inducts the fuel directly, though the interior of the piston must, in such cases, be filled from time to time with viscous oil

Every time it descends, the piston pump drives the sucked-in quantity of fuel-mixture over the ventilator *f*, which is similarly loaded by its own weight, into the so-called super-compression ventilator (see Fig. 30), which simultaneously compensates the pulsations of the fuel-pump, somewhat as an air tank. The cap-like body of the ventilator is inverted over the free end of the exhaust-pipe; the caulked rim of the ventilator being held down by a spring, the tension of which can be so regulated by means of the screw lid that the compression of the fuel at the carburetter amounts to about 0·2 to 0.25. Any surplus supplied by the fuel-pump over the amount required to maintain that pressure and supply the consumption in the carburettor flows down obliquely into the tank (see Fig. 28) surrounding the super-compression valve, which is conducted to the open air. Any marked variation in the fuel pressure is a sign that the air contained in the air-tank has escaped. When working empty, it is necessary only to open an air-tap in the intake piping for a time to enable the air-tank to be refilled with air.

The carburettors (see Figs. 31 to 34) are welded together in pairs and covered with a water-jacket; they adjoin the super-compression valve in the same direction as the fuel piping. In the float chamber *a*, the fuel is taken at *b* and scavenged through a fine sieve, *c*, and kept at a constant height in the usual manner. At this height, it also becomes stationary in the principal nozzle *d* (see Fig. 34) of the carburettor, which is connected with the float tank by the calibrated boring *e* of the bottom screw. In its starting position, the throttle valve *f* (see Fig. 33) releases only one auxiliary bore, *g*, of the case; a finely bored auxiliary nozzle, *h*, directly supplied with fuel from the carburettor penetrates into the bore *g*, and the strong aspiration thus engendered at the upper edge of the auxiliary nozzle (which may easily be adjusted by changing the position of the air valve) enables the fuel to be well inducted and pulverised even when the engine is working slowly. As the pressure on the upper edge of the principal nozzle *d* augments, through the widening of the throttle opening and increasing engine speed, the fuel becomes so much the more highly aspirated and pulverised in proportion and auxiliary air enters through the aperture *i* between the pipes *k* and *l* (Fig. 34), penetrates to the principal nozzle through fine borings *m* and thereby promotes the pulverisation of the fuel and prevents the mixture from becoming too rich in fuel.

The method of carburettor-construction above described is based on the French Claudel carburettor model, and has many recommendations. It is easy of access, and the nozzle can be easily adjusted and taken out from above; its main air stream is perpendicular to the main nozzle, so that the fuel stream branches off at right angles and pulverises well. The fuel-supply which collects at the bottom of the principal nozzle when the engine works slowly, also makes it possible for the throttle to open to its full extent suddenly after a gliding flight until it is quite near the ground, without there being any risk of the engine's "jibbing" before the fuel has time to flow in through the bottom opening of the principal nozzle. Another advantage lies in the fact of there being no need for the usual auxiliary air apertures, controlled by the throttle-valve and limited by curves, as such apertures can never be quite accurately adjusted, and each separate carburettor must therefore be adapted to the engine for which it is intended.

The double spark plugs attached to each cylinder for reasons of safety are independently charged by two dynamos (Robert Bosch Co., Ltd., Stuttgart) with 12 plates of 12 poles. The dynamos are driven obliquely from the rear end of the engine by means of ordinary spring coupling (see Fig. 3). They are symmetrically ranged and constructed for anti-clockwise rotation, and a very simple method is obtained for adjusting the sparking-point by means of the rods.

The cooling water pump is installed at the end of the gear wheel intended for the auxiliary command at the back of the engine, that is, at a spot where the entire contents of the water-jacket and pipes can be discharged. The shaft of the pump is set in ball bearings at the upper end supported by a special block, while the lower end, terminating in a bronze bearing, supports a fixed wheel secured by a pin. The pump has an opening in the middle pipe, and two outlet pipes; it conveys the cooling water on each side of the engine into a main pipe, and this again conveys the principal stream directly through the adjacent cylinder-heads, so that the valve-heads are most effectively cooled. A weaker auxiliary stream of cooling water penetrates the cylinder-jacket from

below through a distribution piping, and a flow of water is thus obtained in the direction of the cylinder-heads.

An important part of the engine is the reducing gear, its function being that of keeping the number of revolutions of the propeller within such limits that the propeller efficiency may be good notwithstanding the much-desired increase in the number of revolutions of the engine. The type in question is the outcome of years of experiment, unsuccessful until now for the very reason that with gear wheels, strong wearing of the wheels could not be prevented in the course of long working, even with larger wheel dimensions. As regards reliability, this type may be classed with the only really durable foreign engine gear—that is, the Rolls-Royce Co.'s gear—though it has the advantage over the latter on account of its great simplicity. The gear has been specially designed to attain the greatest possible transmission ratio for each revolution of the gear wheels, at the same time without exceeding the regulation limits for all-over dimensions and weight. The number of revolutions of the propeller, estimated at about 900 r.p.m. for geared aircraft engines, is therefore augmented to 1,180 r.p.m., a speed which is also compatible with satisfactory propeller efficiency.

The outer part of the gear is connected with the flange of the crankshaft by inside gear work, and the central wheel is fixed. It is therefore provided with a lever, made to revolve on the gear-box and adjustable to some extent, and the unavoidable oscillations of the crankshaft are thus compensated. The four star-wheels, all set on one star, revolve between these two rings of wheels and thus drive the propeller, which is attached to the star. The crankshaft is cast in one piece with the star, and runs on two strong ball-bearings, the inner one located at the end of the crankshaft, the outer one in the gear-case. On this shaft, the fixed central wheel of the gear rests on two ball-bearings, and it is this artifice alone which enables the propeller to be driven by the star. Special care had been bestowed on the location and setting of the star-wheels, which attain an extremely high number of revolutions. Each of them revolves on two double ball-bearings, which are filled with balls and thus work without cages, experience having shown that ball-cages are not capable of withstanding the stress brought to bear upon them during flight. The bearings are lubricated from the interior by oil flowing from the crankshaft cavity. When mounting, the star-wheels can be laid in a regular line along their respective notched discs by turning the cones, which are slightly eccentrically turned; by this means the peripheral forces are evenly distributed over several teeth. The double bearing built into the front end of the crankshaft prevents longitudinal displacement of the crankshaft at the gear. By means of the projecting hexagonal edge, the gear can easily be taken down.

In a newer type of the valve, the regulating lever of the fixed gear wheel (which lever hangs downwards) and one of the ball bearings are dispensed with by the direct transfer of the rotational moment of the fixed wheel to the front flange and to the gear-box through a rotary coupling.

The propeller is attached to an auxiliary flange by the usual hub and short bolt, and the flange is secured to the ball-end of the rear shaft by a key.

THE ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS

RACING COMMITTEE.

A MEETING of the Racing Committee was held on Wednesday, July 27, 1921, when there were present:—Maj.-Gen. Sir Sefton Brancker, K.C.B., in the Chair, Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., Harold E. Perrin, Secretary. In attendance:—Comdr. James Bird, The Supermarine Aviation Works, Ltd., Gen. Caddell, Messrs. Vickers, Ltd., Mr. C. R. Fairey, The Fairey Aviation Co., Mr. E. B. Parker, Messrs. Short Bros.

Proposed Cowes Seaplane Races.—General Sir Sefton Brancker reported that in view of the small number of entries, the proposed Seaplane Races at Cowes fixed for the 2nd and 3rd August, 1921, had been postponed. The representatives of the manufacturers approved of the action taken by the Club, and, after discussion, it was decided to abandon the Races for this year and concentrate on holding an International Seaplane Race in 1922.

A point was raised as to the dates for International Competitions. The Manufacturers stated that insufficient notice was given, and suggested that the Club should recommend to the Fédération Aéronautique Internationale the advisability of fixing the dates and conditions for such competitions at least nine months ahead.

Autumn Race Meeting at Croydon.—It was decided, subject to the consent of the Air Ministry, to hold a Race Meeting at Waddon Aerodrome, Croydon, on one of the Saturday afternoons in September. The races would be round a circuit of about 10 miles, the competing machines being in view of the Aerodrome the whole time. It is hoped to arrange a series of races during the afternoon, so as to bring in all types of aeroplanes, and the Royal Aero Club will allocate approximately £500 in Prizes for the various events. Full particulars will be announced later.

COMMITTEE MEETING.

A MEETING of The Committee was held on Wednesday, July 27, 1921, when there were present:—Brig.-Gen. Sir, Capel Holden, K.C.B., F.R.S., in the Chair, Maj.-Gen. Sir Sefton Brancker, K.C.B., Mr. Ernest C. Bucknall, Lieut.-Col. F. K. McClean, Lieut.-Col. Mervyn O'Gorman, C.B., Rear-Admiral Sir Godfrey M. Paine, K.C.B., M.V.O., and the Secretary.

Election of Members.—The following New Members were elected:—

Lieut. William Richardson Bailey (Royal Gloucestershire Hussars).

John Lord.

Alan Jocelyn Mander.

Racing Committee.—The report of the Racing Committee on the Aerial Derby and the Oxford and Cambridge Race was received.

Cowes Seaplane Races.—The decision of the Racing Committee to abandon the Seaplane Races this year was confirmed.

Autumn Race Meeting at Croydon.—On the recommendation of the Racing Committee a sum of Five Hundred Pounds was voted for the proposed Aviation Race Meeting to be held at Waddon Aerodrome, Croydon, in September next.

Fédération Aéronautique Internationale. — It was decided to place the following subjects on the Agenda for the Conference of the Fédération Aéronautique Internationale to be held in Madrid in October next:—

Aircraft Customs. The Institution of the Tryptique. Superior Brevet.

The fixing of the dates for all International Competitions nine months beforehand.

The following delegates were appointed to represent the Club at the Madrid Conference:—Lieut.-Col. F. K. McClean, Lieut.-Col. Alec Ogilvie, Lieut.-Col. Mervyn O'Gorman, C.B., Mr. H. E. Perrin (Secretary).

Gordon Bennett Balloon Race.—The decision of the Meeting of the Bureau of the Fédération Aéronautique Internationale held in Paris on June 30, 1921, to regard the frontier as the landing place in the event of landings in Russia, was reported and agreed to. It was reported that the Race would start at Brussels on September 18, 1921.

PORTRAITS OF THE LATE MR. H. G. HAWKER AND LIEUT.-COMDR. K. MACKENZIE-GRIEVE.

The Directors of Messrs. Rolls-Royce, Ltd., have presented to the Royal Aero Club the portraits by Mr. Ambrose McEvoy of the late Mr. H. G. Hawker and Lieut-Comdr. K. Mackenzie-Grieve.

CLUB FLYING MACHINES

The following aeroplanes are now available for use by Members of the Club:—

B.E. 2e (Two-Seater)	..	..	90 h.p. R.A.F.
Avro (Two-Seater)	..	..	110 h.p. Le Rhone.
Do.	do.	..	.. Do. do.
Do.	do.	..	.. Do. do.

These aeroplanes are at Waddon Aerodrome, Croydon, and the charge is £3 per hour, inclusive of petrol and oil. The Club's representative at the Aerodrome is Capt. A. F. Muir of the Surrey Flying Services

Members piloting the machines must hold Air Ministry Licence. The Club will make arrangements to supply pilots for the machines, in case of Members other than pilots wishing to make flights. There is no restriction as to distance, and flights abroad may be made by arrangement with the Club. Members may also take up their friends.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W.1.
H. E. PERRIN, Secretary.

FLIGHT

FRANCE TO ORGANISE FIRST INTERNATIONAL AIR NAVIGATION CONGRESS

To be Held Concurrently With Next Paris Aero Show

UNDER the patronage of the French Under-Secretary of State for Air, the French *Chambre Syndicale des Industries Aéronautiques* has taken the initiative in convening an International Air Congress, to be known as the First International Air Navigation Congress, and to be held concurrently with the next Paris Aero Salon, from November 15 to 26, 1921, to afford an opportunity of discussing the various problems connected with commercial aviation. The President of the organising committee is Monsieur P. E. Flandin, late Under-Secretary of State for Air, who will be assisted by a number of well-known French experts as vice-presidents. The President of the Technical Committee will be M. R. Soreau, who is President of the Aviation Commission of the French Aero Club. The Air Navigation Committee will be under the presidency of Col. Sacconey.

By inviting communications from all interested in the question of commercial aviation, it is hoped to establish an interchange of ideas which will be of great help in the furtherance of aviation all over the world, and give an opportunity of discussing such problems as affect the future development of commercial flying. Those who wish to help in any way towards the success of the Congress can do so in two ways—by becoming full members or by becoming associate members. The fee charged for the former has been fixed at £1, while associate members are charged 10*s*. Full members are entitled to send in communications to the Congress, and will also receive a *résumé* of the communications. Associate members are not entitled to send communications, but will be able to take part in any receptions held, or in practical demonstrations at Le Bourget, etc. Payment should be by cheque or money order, made out to the *Chambre Syndicale des Industries Aéronautiques*, 9, Rue Anatole de la Forge, Paris (XVII[e]). At the conclusion of the conference the proceedings will be published in full, and a copy of the published report will be obtainable by associate members as well as full members for the price of £1.

Printed forms of application for membership, as well as intimations of papers or communications which it is intended to submit to the Congress, can be obtained from the General Secretary, International Air Navigation Congress, 9, Rue Anatole de la Forge, Paris (XVII[e]).

Communications should be kept as short as possible—about 2,000 words will be a suitable length—and should be typewritten on one side of the paper only. Line drawings may accompany the communications, but they should be carefully drawn, and the space available for their reproduction is limited to two pages of the report of the Congress. Communications and papers should be submitted before October 15, 1921, so as to ensure a *résumé* being printed in time for the Congress. Papers which arrive after that date will not be published until the issue, after the Congress, of the Proceedings.

Papers and communications may be written in either of the following languages—French, English, German, Italian, or Spanish.

With regard to the papers submitted, these should bear on one of the following subjects :—

(A) **Technical Committee**

(1) The utilisation of results of wind tunnel model tests for full-size calculations.

(2) Aeroplanes and seaplanes (monoplanes or multiplanes). Thick and thin wings. All-metal structures and composite structures.

(3) Airships with great carrying capacity.

(4) Commercial aero engines; their arrangement in the machine, and their transmission gear.

(5) Apparatus for fixing the position of an aircraft and of tracing its route.

(B) **Air Navigation Committee**

(6) Air routes.—Outline, management, wireless, meteorological information, aerodrome installation and ground organisation.

(7) Commercial aviation.—Commercial machines (aeroplanes or seaplanes, passenger, goods and mail machines). Charts. Organisation and exploitation of regular air lines. Air mail.

(8) Air legislation.—Regulations. Customs. Examination of personnel and material. Safety. Insurance.

We welcome this Congress which, if properly handled—and the list of names appearing under the various sections should be a guarantee of that—cannot but be of benefit to the future development of commercial aviation. It is to be hoped that a number of papers will be sent from this country so as to contribute our share towards the common weal. Whilst not wishing to criticise in any way the organisation of the Congress, a perusal of the subjects to be discussed appears to indicate a lack of reference to the financial side of the question. And yet it is this side which plays one of the most important parts. The whole future of aviation as a commercial proposition is closely connected with the manner of finding the necessary capital for the earlier stages of the work. We could therefore have wished to see the financial side given more prominence among the various subjects, so as to draw, if possible, papers and communications dealing with this aspect of aviation, and thus possibly furnish ideas and suggestions which would help towards obtaining that financial assistance without which aviation—at any rate, commercial aviation—cannot progress as we should like to see it progressing.

In conclusion, it should be mentioned for the benefit of intending visitors to the Congress that Messrs. Th. Cook and Son have been appointed official agents, and that all arrangements for travelling, hotel accommodation, etc., can be made through them.

Air Cadetships

THE following twenty-five are declared by the Civil Service Commissioners to be the successful candidates at the competitive examination held in June, 1921, for admission to the R.A.F. Cadet College, but their admission is conditional on their having passed the medical examination. A Table of Marks will be sent to each candidate as soon as possible :—

Name.	Marks.	Name.	Marks.
Worthington, G. L.	10,388	*Baxter, H. R. F...	5,878
*Coggle, C. K. J...	8,211	Hutchinson, J. H.	5,665
*Davies, A. D. ..	8,114	Beaumont, F. W. L. C.	5,377
*Broadway, B. D. J.	7,906	Dickens, L. W. ..	5,304
*Maxwell-Gray, S.	7,516	Meredith, P. R. ..	4,906
Clifford, G. R. M.	7,287	Blair, R. E. C. ..	4,750
*Rae, F. H. ..	7,271	Thubbon, G. E. ..	4,635
Roberts, R. A. P.	7,084	Mellor, H. M. ..	4,511
*Thomson, D. L...	6,761	Tufnell, N. J. ..	4,430
Beamish, F. V. ..	6,541	Fuller-Good, J. L. F.	4,402
*Jones, P... ..	6,303	Taylor, R. S. ..	3,963
Norman, H. M. ..	6,176		
Pritchett, N. A. P.	6,031		
*Maurice, R. G. ..	5,902		

* These candidates have received marks for military efficiency.

In the list of successful candidates for Eastern Cadetships is Lieut. H. J. Cockman, D.F.C.

Laladier Flies Up Mont Ventoux

EMULATING the mountaineering feat of Durafour, M. Laladier on Sunday last flipped up Mount Ventoux (Isère), landing on the Col des Tempetes—about 6,000 ft.—during pretty violent weather. It was certainly a novel way of attending the motor-car hill-climbing contest, which was in full blast on that day.

Australia Arranges Air Service

FROM Melbourne it is announced that the Federal Government has accepted a tender of £25,000, submitted by Major Brearley, of Western Australia, for the postal and business air service from Geraldton to Derby, a distance of 1,200 miles. The service, which will be weekly, is to begin on October 30. Routes are planned for direct services between Sydney and Adelaide and Sydney and Brisbane.

Lieut. Parer Abandons Australian Flight

IN his proposed flight from Melbourne on a 10,000 miles flight round Australia, Lieut. Parer did not, unfortunately, get very far. He started on August 3 from Melbourne, in a gale, and about 40 miles out he ran into a blinding snowstorm. As his engine was running badly, he determined to descend. Having landed safely, he was standing near his machine, when a blast of wind tilted the machine and threw him against the whirling blades. His collar-bone was fractured, and he received injuries to his leg and toes. He is now in hospital.

LONDON TERMINAL AERODROME

Monday Evening, August 8.

Two air transport companies have created new records for themselves this week. The Instone Line have carried no fewer than 188 passengers over the London-Paris route, and the Messageries Aériennes have flown 103 air travellers over the same route. Both these figures are records for the firms concerned. In spite of this, however, the total of all traffic for the week was below that for the past few weeks, being only 482. This is due to a falling-off in passengers on the Amsterdam route, and to an epidemic of engine-trouble on the "Goliaths."

Only nine passengers travelled by air during the week between London and Amsterdam, a fact which well illustrates the extraordinary fluctuations in traffic that air transport firms have to face. There is no apparent reason for this sudden "slump," but one theory advanced is that Dutchmen do not as yet believe in flying in anything but the best weather, and, if conditions are at all doubtful, prefer to go by boat.

Types of Air Travellers

THERE is, of course, a vast difference between the type of passenger to Holland and the type flying to and from Paris. On the Paris route a very large proportion of the traffic is provided by Americans "doing Europe" and who include the flight to Paris as an essential feature of their itinerary; whereas the Amsterdam traffic is composed almost entirely of Dutch and German business men.

The British business man hardly enters into the calculation so far. He has not yet learned to fly. As a class, in fact, he does not seem to know the "airway" exists; and, even should he hear of it, he makes no effort to obtain details or use the facilities offered. Of course there are honourable exceptions, but it seems too early yet to hope that air transport should overcome the conservatism and inertia of the average British business man.

The number of "aliens" travelling by air is really remarkable and, if an analysis of the passport officer's books at Croydon could be obtained, it would show an overwhelming preponderance of foreigners. To all intents and purposes, in fact, the British air traveller is a negligible quantity.

Derelict Airship Mast

THE airship mooring-mast is a desolate sight. The alterations to the mooring "head" had not been completed when airships, and everything appertaining to them, went into a state of suspended animation on August 1, and the mast-head now hangs over drunkenly—held up by temporary sheer-legs. "Puffing Billy," and the rest of the accumulation of workshops and winches, at the foot of the mast, are shrouded in torn tarpaulins, which flap dismally in the wind. The whole thing is a nuisance now that it is not being used. If it served any useful purpose the obvious disadvantages would have been outweighed, but, as it is, it is simply a danger to aeroplane pilots—standing as it does right in the way of the best position for taking-off.

The mast has cost something like £25,000, and the R. 33 has been moored there twice. On one occasion she was there for about half-an-hour, while on the other she stayed all night. If nothing more is done with the airships, this means that it has cost £12,500 each time the ship was moored at Croydon. In any case I understand that the land on which the mast stands does not belong to the Air Ministry, and that no permission to erect the mast on that land was asked for or obtained. I hear, furthermore, that the owners of the land have a promise from the Air Ministry that the mast shall be pulled down.

Mr. Holmes, who has been piloting monoplanes for the K.L.M., is, I understand, joining the Instone Air Line. Mr. Holmes was one of the pilots of the D.H. 18's in the old "Airco" days, and has had considerable experience on this machine.

Work of the D.H. 18's

THE D.H. 18's are, by the way, doing wonderful work, going to and fro between Croydon and Le Bourget with the regularity of express trains. Mr. Hall keeps the Napier "Lion" engines tuned to the pitch of perfection, and Mr. Barnard, who was not at first enamoured of either the machine or engine, is now loud in their praise.

One of the funniest sights on the aerodrome is the procession which wends its way from the tarmac in the Customs enclosure, through the Customs house, and then disperses among offices and sheds, after the departure of the Instone machines each day. The entire Instone staff appears to congregate round the machines before they depart. On one occasion as many as 23 were present to see the two D.H. 18's get away. If all the other firms followed suit the aerodrome might have to be enlarged.

Aerodrome Improvements

STILL further improvements are now being carried out on the tarmac. Work has been commenced on the laying of a tarmac road from the sheds to the Customs enclosure. This will enable machines to "taxi" to and from the sheds with comparative ease, saving the wear-and-tear. The annual tar-spraying of the aerodrome roads is in full swing, and the tar has penetrated to the floors of the offices and sheds.

Mr. Greig, of the Messageries Aeriennes and S.N.E.T.A., is extremely pleased with the week's record. Not only did the French service do well, but to and from Brussels there were 34 passengers—which is quite a lot for S.N.E.T.A. Things have gone so smoothly in fact that M. Didier, who is responsible for departures and puts an enormous amount of energy into his work, has apparently not been able to get his full week's exercise from the manipulation of his own machines, and was seen lustily swinging the propellor of a reluctant "Goliath."

Grands Express have had another epidemic of engine trouble, and their service, which has been as regular as clockwork for weeks, has been disorganised. It is not only on this side that trouble has been experienced, but in Paris as well. Nearly every engine on the service has given trouble at one time or another during the week, and many of the "Goliaths" have been laid up.

The New Air Schemes

ALTHOUGH, officially, all schemes submitted to the Air Ministry for the running of services under the new subsidy were to have been in by August 1, I understand that some latitude is to be allowed in this respect. I hear, too, that there is a hitch in the negotiations with certain companies as the Ministry state that a company must find 50 per cent. of the purchase price of machines, the Air Ministry loaning them the other 50 per cent. This is not suiting some of the promoters of companies who thought they could, under the new scheme, run an air service with very little capital; or, in other words, risk little or nothing.

During the week Mr. Olley, on one of the monoplanes, did not arrive at Croydon before dusk, and rockets and Verey lights were fired for his benefit. One of these fireworks ignited the grass; but the C.A.T.O. staff are used to grass-fires now, and it was quickly extinguished.

Captain Herne has been summoned under the Air Ministry regulations for not having his "airworthy" certificate endorsed daily by a certified ground engineer. The case is to be taken at Croydon on Saturday.

Air-Race Projects

MR. PERRIN, of the Royal Aero Club, has been attempting to arrange for week-end races at Croydon, but it is obvious that a great deal of work would have to be done if crowds are to be accommodated. It is doubtful, too, if any of the aerodrome can be spared for permanent enclosures, as, even now, some of the pilots complain that it is on the small side. Although statements as to air races at Croydon have appeared in the Press, nothing definite is known of such events at the aerodrome itself, and no orders for enclosures have been given.

Captain Muir, of the Surrey Flying Services, flew to Brighton on Saturday to pick up a passenger who wished to catch the boat at Folkestone late on Saturday evening.

The Vickers Vimy came to grief at Le Bourget on landing there on Saturday, her undercarriage giving way. Spares were obtained from Brooklands by air and taken over to Le Bourget on a D.H. 18.

The Cricket Competition

THE inter-section cricket competition is reaching its final stages. So far the Instone team are unbeaten, and the Meteor and Wireless team have only been beaten once. The next match is between these two teams, and will settle the championship. If the Meteor and Wireless win they tie for first place, whereas, if Instones win, the championship is theirs.

On Tuesday, after Customs' and Searchlights were all out for 33, Instones scored 41 for one wicket. As a contrast to this easy win, the C.A.T.O. only managed to win against Handley Page Transport on Thursday by one run.

The position of the teams is now:—Instones, 100 per cent.; Meteor and Wireless, 66 per cent.; Handley Page Transport, 50 per cent.; C.A.T.O., 33 per cent.; Customs, Searchlights, Police, 0 per cent

FLIGHT

THE COMING TRANS-ATLANTIC VOYAGE OF "R. 38"

Departure Towards End of August

HAVING been completed towards the end of July, the "R. 38," or, as she will be called under American ownership, "Z.R. 2," is now at Howden, Yorkshire, where her American crew is getting used to her little ways, and whence she will start for America towards the end of this month. "R. 38" is by far the largest airship built and designed in this country. It is therefore with a good deal of regret that we see the ship, and with her all the lessons she has taught us in the course of her design and construction, getting ready to depart on her trans-Atlantic voyage.

With her overall length of 695 ft., and diameter of 85 ft. the "R. 38" has a cubic capacity of 2,700,000 cu. ft., giving her a gross lift of 83 tons. As the weight of the airship is considerably less than half of that weight (she is very efficient as regards structure weight), she will have ample lift for fuel, ballast, etc., sufficient for a far longer journey than that contemplated.

Originally it was decided by the Admiralty, in the spring of 1918, to build four airships of this type, but when the change in airship policy occurred only the "R. 38" was building. Construction was commenced in November, 1918, at the Cardington (Bedford) works of Messrs. Short Brothers. In April of last year the factory at Cardington was taken over by the Government, and there the construction was continued, ultimately coming to a conclusion a few weeks ago. The American Navy Department is to pay us £500,000 for the airship, but we had far rather seen her remain in this country to provide data for the running of commercial airship services to India and Australia.

The American crew has been in this country for months learning how to handle a big rigid airship, and on her trip to America "R.38" will be manned by American officers and men, although it is expected that several representatives of this country will also be on board. The airship will be in charge of Commander L. N. Maxfield, of the U.S.N., who will have with him Major P. E. van Nostrand, of the U.S. Army Balloon and Airship Section. Lieut. T. A. Tinker will be in charge of the official log of the voyage. We understand that Mr. C. I. R. Campbell, Superintendent of the Royal Airship Works at Cardington and designer of the "R. 38," will be one of the passengers, as will Major Pritchard, who made the double journey with Scott in the "R. 34."

It is the intention to station four U.S. warships in the Atlantic so as to enable "R. 38" to be in constant wireless communication with one or the other the whole way across. The route to be followed will probably be approximately the same as that followed by "R. 34." As the cruising speed of the airship is in the neighbourhood of 60 m.p.h. with her six Sunbeam engines, she should do the journey in rather less than 60 hours, but as adverse winds may be expected over a great part of the route, it is not expected to do the trip in much under 90 hours. In any case, speed is not the first consideration on this trip, and every attempt will be made to take the opportunity of learning as much about the weather conditions in the Atlantic as possible on the way across. The destination of "R. 38" is Lakehurst, New Jersey, where a huge shed has been built for her reception.

If the trip is successful it is, we understand, the intention of the American authorities to send "R. 38" across America to the Pacific coast, in order to determine weather conditions on different trans-continental routes, so as to discover the best air route between New York and San Francisco, where, it is thought, a very considerable saving in time might be effected by an airship service. As a matter of fact, the journey by train occupies four days, while the airship should be able to do the trip in from 1½ to 2 days. In this respect America is very favourably situated, having great distances between large cities, and therefore airship travel may be presumed to offer a more promising field there than it does in smaller countries. It is true that in Europe the distances are somewhat short for the full utilisation of the capabilities of airships, but on longer journeys—as, for instance, from London to India and Australia—they should be capable of good service, although this would entail flying over different foreign countries if the direct route were to be followed.

Before starting on the trans-Atlantic flight it is hoped that there will be time for the crew to get a practice flight of about 24 hours' duration, so as to become accustomed to the handling of the ship. It is possible, however, that there will not be time for this, as it is getting somewhat late in the season.

THE SCHNEIDER CUP RACE AT VENICE

Will Italy Retain the Cup?

FROM being a keenly-contested event, the annual race for the Schneider Cup seems to have degenerated into a sort of one-man show, in which no one takes any particular interest. In the years before the War one could always be certain of seeing representatives of at least three countries at the seaplane race of the year. Now the entries are few and far between, and often those which do turn up manage to get deleted in the preliminary tests. In a great measure this country must be held responsible for this state of affairs, not by any sins of commission (unless one so classes the unfortunate affair at Bournemouth in 1919), but rather by sins of omission, by refraining from sending any representatives to the race last year, and again this year. This is all the more regrettable, as this country has all the requirements for becoming the world's leading seaplane power. Our seaplanes are second to none, but we do not seem to realise their possibilities in the development of commercial aviation. It is true that the Schneider Race is a speed event, pure and simple, but even so the lessons learned and the experience gained would be invaluable to the designer of commercial types. The present state of the country's finances is mainly to blame, but we cannot help thinking that with a little good-will the Royal Aero Club and the S.B.A.C. between them ought to have been able to send representatives to Venice this year.

Last year the race was a walk-over for Italy, there being no foreign competitors for the Cup, which was won by Bologna on a Savoia. This year one French competitor was entered—Sadi Lecointe, on a Nieuport with 300 h.p. Hispano engine; but we regret to learn that he had bad luck in alighting after a test flight, damaging his undercarriage to such an extent as to preclude his taking part in the race.

The question now arises whether or not Italy is to retain the Cup. By the rules of the competition the country which has won the cup three times in five years has the right to retain it. After the lamentable affair at Bournemouth in 1919 it was at first stated that Janello on the Savoia had failed to round one of the mark boats properly, but ultimately it was decided to give the Italian Aero Club the custody of the Cup, and to hold the next race in Italy, under the organisation of the Italian Aero Club.

If Janello is declared to have won the 1919 race properly—as we think he ought to be if there was sufficient doubt in the minds of the Royal Aero Club officials to let the Cup and the race for the following year go to Italy—it would appear that Italy becomes the permanent holder of the Schneider Cup—in which case we shall probably have to write *finis* to the annual Schneider races.

Perhaps in that case some other public-spirited sportsman may be found to present a new Cup.

As regards the Schneider race this year, Sadi Lecointe was the only foreign competitor entered. As we have already said, he had the misfortune to crash his undercarriage (it does not appear to have been the floats themselves in this case) after a test flight. This left only the three Italian competitors. It is of interest to note that no less than ten Italian machines had been entered for the race. (We wonder if this country would have produced ten machines, had the race been held here?) The eliminating trials left three competitors for the actual race. These were:—

Briganti on a Macchi flying boat, type VII, with 200 h.p. six-cylindered Isotta engine. This machine has an area of 215 sq. ft.

Zanetti was flying a considerably larger machine, viz., a Macchi, type XIX, with 12-cylindered Fiat engine of 700 h.p., with a wing area of 485 sq. ft.

Corniglio was flying one of the Naval flying boats with 250 h.p. Isotta engine and a wing area of 290 sq. ft.

In the actual race two of the competitors dropped out. Zanetti's machine caught fire, but happily he and his mechanic were rescued. Corniglio ran out of petrol and had to abandon the race. This left only Briganti on the smallest machine, who completed the course at the average speed of 119 m.p.h. It was, as a famous French pilot put it on one memorable occasion at Monaco, a "Valk-vaire."

AIRISMS FROM THE FOUR WINDS

THE Pulitzer Race, which was to take place in Detroit in September, has been cancelled for this year. Next summer is the date named for the event. The trouble appears to be that the U.S. Government has barred Army pilots from participating.

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AMERICA really does look like putting her air services under one administration, as President Harding is said to favour the lead of England in this connection.

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IT is a little disconcerting for the pioneer flyers of the present decade to learn after all how horribly old-fashioned they are in the art. According to Iqbal Ali Shah, in the *Hindustan Review*, ancient Hindu literature contains many allusions to flying machines, couched in words which would suggest that actual flight in the days agone, centuries back, was quite the vogue. These references were not fixed to one period only, but are books written at various times as the social and religious development of the Brahmans progressed.

In the two great Hindu epics, "Mahabharata" and "Ramayan," which were written to celebrate the exploits of kings, and the conflicts of a certain internecine war, the part played by the flying machines during that period is mentioned, especially in the latter book. "Ramayan," which was compiled about the year 5000 B.C., contains some passages which say that Rawan, the King of Ceylon, used to fly over his opponents and in some way or other impede their progress; but whether they threw primitive bombs or not, it is impossible to say. An account is further contained in "Ramayan" that after the fierce struggle between the Brahmans and the King of Ceylon, in which Rawan was defeated and killed, this wonderful "flying carriage," as it is termed in the book, fell into the hands of Ramchandra, the Ksatriya chief, who flew in it from Ceylon to his capital at Ajudhia in Northern India.

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AGAIN the greatest of the Hindu poets, Kalidas, treats of this aerial journey in his poem entitled "Raghu Vuns." Another poet, about 200 years later, while describing the war between two Hindu tribes led by Risho and Arjin, also speaks of a "flying carriage."

In another Hindu book called "Mahabharat," one reads of a king giving another king a flying machine, as a token of his friendship.

"Puranas" is another Sanskrit book which tells us of a huge flying machine possessed of the power of travelling.

BESIDES these references to the books there are terms and phrases which are used for flying in its different aspects, and it is no undue tax to one's intelligence to know that when a language is forming the words and terms are coined as necessity arises, and are added to the vocabulary from time to time; hence, had there been no flying machines, the usage of such phrases would not be required. But as they exist to this day in the Sanskrit books it is claimed as evidence of the presence of flying machines at the very earliest period of the world's history.

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IT should, however, be noticed that the word "flying carriage" is used, and this word "carriage" should not be misunderstood, for an Indian conception of a carriage is a thing which will hold people, and is movable; not necessarily dragged by horses or other animals, which is a horse of quite another colour.

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THAT is an interesting report from Dover of the discovery of the function of birds' feathers. What we particularly like about the report is that the new discovery will enable a man to fly from the sea front at Dover all round the harbour and back in perfect safety *on a motor-cycle*. If the "human" feather will do that it will do more, and people like Handley Page are simply wasting their time on comic slotted wing sections. We are informed that the feathers will *not* be kangaroo feathers.

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OVER our cup of breakfast chicory, the other morning, our eyes caught this startling headline in a certain daily:—

"ENGINE FALLS OFF AN AEROPLANE."

Strange Mishap at Opening of 10,000 *Miles Flight.*

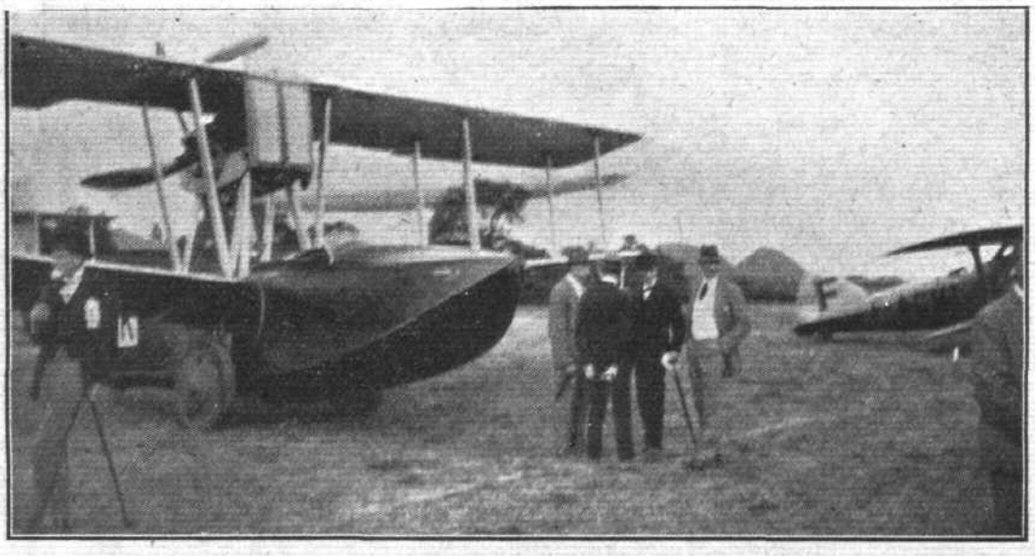
Needless to say we read on eagerly:—

"Amidst showers of hail and rain, and with the adjacent hills snowclad, Lieut. Parer, accompanied by an engineer and a cinematographer, left Melbourne at midday on a 10,000 miles flight round Australia.

After travelling 50 miles the engine was missing, but the machine landed safely."

We seem to have heard of this before—but have never seen it in cold print!

Reading on further, we learnt that on landing the wind blew open Lieut. Parer's coat, which caught the propeller, and the lieutenant was thrown to the ground, his legs and ankle being broken. In spite of the "missing" engine, it would seem that the propeller, being of a well-known make, was going on its own reputation.



DOMINION PREMIERS INSPECT "AMPHIBIAN": There is little doubt that in the Colonies and Dominions, no less than at home, the amphibian type of aircraft has an enormous future before it. It was therefore very fitting that on their recent visit to Waddon the Dominion Premiers should have an opportunity of inspecting the Vickers "Viking III," 450 h.p. Napier Lion, which won First Prize in the Government competition last year, and which has since done such good work in demonstrating the possibility of using the Thames and Seine rivers as "aerodromes." In the photograph Capt. Cockerell, the well-known Vickers pilot, is seen in front of the machine, in conversation with Sir F. Sykes and Capt. Guest, Secretary of State for Air.

FLIGHT

THE ROYAL AIR FORCE

London Gazette, August 2, 1921

Wing Comdr. A. D. Warrington-Morris, C.M.G., O.B.E., relinquishes his appt. of Dep. Dir.; Aug. 1.

Permanent Commissions

Flying Offr. G. W. R. Fane, D.S.C., resigns his commn., and is granted rank of Capt.; Aug. 3.

Medical Branch

Sqdn. Ldr. W. Tyrrell, D.S.O., M.C., is granted a permanent commn. in rank stated, with effect from Oct. 1, 1920, and with seny. Aug. 1, 1919, and to take prec. immediately above Sqdn. Ldr. W. W. Shorten (substituted for *Gazette*, Oct. 8, 1920.)

Stores Branch

Flying Offr. F. W. Powell is placed on ret. list; Aug. 3.

Short Service Commissions

The follg. are granted short service commns. as Flying Offrs. with effect from, and with seny. of, dates indicated, except where otherwise stated:—*W. R. B. Annesley; July 20. *M. D. Nares, A.F.C.; July 26. W. N. Sherlock; July 21. O. E. Worsley; July 19.

* These Offrs., previously substantive Flight Lieuts., will be placed at head of list of Flying Offrs., but junior to all Offrs. similarly reduced in rank on grant of permanent or short service commns.

The follg. Flying Offrs. resign their commns., and are permitted to retain rank of Lieut.:—J. Holthouse; Jan. 24 (substituted for *Gazette*, Feb. 4). W. E. Gandell; July 2 (substituted for *Gazette*, July 6). Flying Offr. B. Holding to take rank and prec. as if his name appeared in Air Force List next below Flying Offr. O. V. Lee, seny. April 25, 1919.

Medical Branch

H. S. C. Starkey, M.D., M.A., is granted a short service commn. as a Flight Lieut., with effect from, and with seny. of, July 18.

Flying Branch

Lieut. L. V. J. Pogson, M.C., relinquishes his temp. commn. on appt. to Ind. Army; May 27, 1918.

Nursing Service

Miss C. Walker is apptd. Staff Nurse; Jan. 27.

London Gazette, August 5, 1921

Sqdn.-Ldr. J. C. P. Wood is placed on half-pay, Scale A, from March 31 to April 8 inclusive, and from June 16, until further notice. *Gazettes* April 12 and June 24 are cancelled (substituted for the notification in the *Gazette* of July 29).

Permanent Commissions

Flight-Lieut. T. Gran, M.C., relinquishes his commn.; Aug. 6. Sqdn.-Ldr. E. L. Conran, M.C., is placed on half-pay, Scale B, for eight months from June 14.

Stores Branch

Flight-Lieut. H. V. Jerrard is placed on half-pay, Scale B, from July 26.

Flying Branch

Lieut. (Actg. Capt.) J. Hutchings (unemployed list) relinquishes his temp. commn. on appointment to the T.F. Sec. Lieut. (Hon. Lieut.) V. A. Leppan relinquishes his temp. commn. on account of ill-health contracted on active service, and is permitted to retain the rank of Lieut.; June 18, 1919 (substituted for *Gazette*, Dec. 30, 1919).

Administrative Branch

Lieut (Actg. Capt.) J. M. Peel (unemployed list) relinquishes his temp. commn. on appointment to the T.F.

Memorandum

Hon. Sec.-Lieut. F. M. Porter relinquishes his commn.

IN PARLIAMENT

Air Ministry

MR. E. HARMSWORTH, on August 3, asked the Secretary of State for Air the date when Air Vice-Marshal J. F. A. Higgins, C.B., D.S.O., A.F.C., was put in charge of the central editing section; the cost to the country since the institution of the office; and whether some more suitable and more onerous duties could be found for the officer in charge?

Mr. Parker (Lord of the Treasury): Air Vice-Marshal Higgins was placed in charge of the central editing section on January 17, 1921, and the cost of the section, since its institution, is about £1,350. My right hon. friend cannot admit the implication contained in the last part of the question. The production of training and other text books, embodying the principles of air warfare as evolved during the War, is a work of great importance and responsibility. A list of the books already produced, and those in preparation, will be sent to the hon. member.

Airships

LIEUT.-COMMANDER KENWORTHY asked the approximate yearly rate of expenditure on lighter-than-air airships establishments during the present year up till August 1 last; and what has been the yearly rate of expenditure on direct assistance to civil aviation, excluding expenditure on lighter-than-air airships, to date during the present year?

Mr. Parker: The approximate expenditure at airship establishments during the four months ended 31st ultimo was £94,000, excluding the cost of work on "R.38." The yearly rate of expenditure based on this figure would therefore be £282,000. The expenditure on subsidies to civil aerial transport companies during the same period of four months was £23,000. Owing to the impending change in the method of subsidy, the yearly rate of expenditure cannot be deduced from this figure.

Imperial Conferece Resolution on Airships

MR. RAPER on August 4, asked the Secretary of State for Air what is the decision of the Imperial Conference regarding airships, what action the Air Ministry have taken, or purpose taking, regarding the airships, airship plant and equipment, and both the service and civilian airship personnel; further, if he will now publish the expert committee's report on airships which was submitted to the Imperial Conference?

The Secretary of State for the Colonies (Mr. Churchill): The decision taken as to the disposal of the airships is best explained by quoting the following Resolution adopted on August 2:—

"The Conference, having carefully considered the report of Mr. Churchill's Committee on Imperial Communications, are of opinion that the proposals contained therein should be submitted for the consideration of the Governments and Parliaments of the different parts of the Empire.

"On the understanding that the cost will be in the region of £1,800 per month, they recommend that, pending such consideration, the existing material, so far as useful for the development of Imperial air communications, should be retained."

With regard to the disposal of the Service and civilian airship personnel, the former will be absorbed within the Royal Air Force, while the latter (all of whom are serving on temporary engagements) have already been given notice, or will receive notice.

With regard to the last part of the question, the report will be published as a section of the report of the proceedings of the Conference.

Mr. Raper: Would the right hon. gentleman state whether, in the meantime, the offer made by the Government to British civilian firms to take over the airships on terms approved by the Government is withdrawn?

Mr. Churchill: I think notice should be given of that. I doubt very much whether it would be withdrawn.

To Fly to the Pole

FROM New York it is reported that Mr. Edwin Fairfax Naulty, a physicist, intends to fly over the North Pole. Accompanied by three other explorers, he proposes to start from Point Barrow in Alaska, and, proceeding to Spitzbergen, land at the Pole *en route*. If this should be impossible he will cover the whole distance of approximately 1,500 miles in one stage. We like an optimist. Afterwards he will fly to London in easy stages. We like him still more.

The Dayton-Wright Wing

A GOOD deal has been talked recently about the new Dayton-Wright aeroplane wing, which is said to give extraordinarily good results. Briefly, the new wing consists of an ordinary wing with leading and trailing edges pivoted so as to allow of varying the camber. The monoplane entered for the Gordon Bennett race last year had, it may be remembered, a wing constructed upon this principle. The results, although promising, were not all that was expected, but it is thought that this was due to the particular shape used rather than to the fundamental principle. In the new wing a somewhat different arrangement has been adopted, which is said to have given much better results. In the new wing, we understand, the trailing edge is hinged only as regards its lower half, being split horizontally so that the upper surface remains fixed. It is a little difficult to account for the extra lift so obtained, and it might have been thought that the chief effect would be to add greatly to the resistance, the trailing edge performing in fact the function of an air brake. However, apparently the lift is also much increased.

A Holiday Camp at Littlestone Aerodrome

THE Duke of York having arranged a camp at Littlestone Aerodrome, New Romney, for some 400 boys from Eton, Harrow, and other public schools throughout the country, and a number of representatives of working-class organisations, the 400 were, on the Saturday before Bank Holiday, entertained at luncheon in the Royal Riding School at Buckingham Palace Mews, before taking train at Charing Cross for New Romney.

Wing-Commander Louis Greig, the Duke of York's equerry, briefly addressed the company, and told them the camp was the Duke's own idea entirely. He would have greeted them in person, but it was necessary for him to travel with the Queen to Cowes that day. The Duke had asked him to say:—"Tell them to enjoy themselves and have a jolly good time. Say that I am going down to see them on Thursday next, and to spend a couple of days with them, and if they are not having a good time I shall jolly well want to know the reason why."

PERSONALS

Married

Flight Lieut. W. R. DYKE ACLAND, D.F.C., A.F.C., R.A.F. son of Sir Reginald and Lady Acland, of Cold Ash, Newbury, Berks, was married on August 4 at Stubbington Church, to MARY STRANGE, daughter of Mr. and Mrs. T. MARSHALL, Trelawny, Lee-on-the-Solent.

FRANCIS BELL BARAGAR, A.F.C., son of Charles Inkerman Baragar, J.P., of Elm Creek, Manitoba, Canada, was married on August 1, at the Parish Church, Boughton Aluph, Kent, to MADELEINE FLORENCE HALLORAN, eldest daughter of the Rev. J. A. Halloran, Rector of Eastwell with Boughton Aluph, Kent.

To be Married

A marriage has been arranged, to take place shortly, between A. H. ROY FEDDEN, of Henbury, Glos., chief engineer to the Bristol Aero Engines, Filton, Glos., and ETHEL MARY GILMAN, at present at 21, Cornwallis Crescent, Clifton, Bristol.

The engagement is announced between Major L. A WATSON STOWER, M.C., Croix de Guerre, R.A.F. (late the London Scottish and R.A.O.C.), son of the late J. S. Stower, of Castle Rising, Nottingham, and DIANA HELEN, only daughter of the late Sir STEPHEN MACKENZIE, M.D., and Lady MACKENZIE, of 18, Cavendish Square, and Dorking.

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Air Mail and Time Saving

THE Postmaster-General again announces that the mails for Egypt, India, etc., and for Australia, which were despatched by air from London to Paris on the past two Fridays, duly overtook the ordinary mails which left England on the Thursdays, and have been forwarded respectively from Marseilles by the P. & O. Packets and from Toulon by the Orient Packets.

Newspaper Enterprise in Spain

RECENTLY an enterprising Spanish journal was able to bring off a "scoop" by making use of an aeroplane. Immediately upon the outbreak of hostilities in Morocco, the Madrid journal, *La Libertad*, obtained the use of a "Bristol" Tourer, piloted by the well-known British aviator, Major de Havilland. With a war correspondent on board, the "Bristol" left for the scene of operations. After a lengthy flight the machine reached the African aerodrome, where it had been intended to land. It was found, however, that the aerodrome was already occupied by the enemy. As a landing was out of the question, Major de Havilland circled around at a height of a few feet off the ground, the enemy scattering in all directions. The war correspondent had the time of his life, and after a few minutes of this mild form of frightfulness the machine returned to Spain, after a flight of 120 miles over the sea, alighting safely at Almeria. Next morning the machine arrived back in Madrid, and the correspondent was able to bring off his "scoop." The distance covered in the 24 hours was probably not far short of 1,000 miles. But then the machine and engine were "Bristol" and "Siddeley," added to which there was some pilot.

"Centaurs" for Belgium

AT the Northolt aerodrome of the Central Aircraft Co. there have been in use for a couple of years some very successful dual control training machines, fitted with 100 h.p. Anzani engines. These machines, designed by Mr. "Tony" Fletcher, have a remarkably low landing speed, are very stable, have a high factor of safety, so that they can be stunted to any extent, and finally are so efficient that they carry three people comfortably. Small wonder, therefore, that the "Centaur 4" has established a high reputation for school work, a reputation which, it now appears, extends beyond the seas. Quite recently one of these machines was sent to Belgium to give demonstrations. As an immediate result six of the machines were ordered, and the Belgians were so impressed with its performance that they insisted upon keeping the demonstration machine so as to put it into service there and then. Although the Central Aircraft Co. have only just received the order, the remaining five machines will be finished and delivered within a month. Smart work that, and typical of Cattle organisation.

German Aero Material still under the Ban

ACCORDING to a Coblenz report, the Minister of the Treasury and the Reich Aviation Department have, in agreement with the Inter-Allied Air Control Commission, seized all reserves of aeronautic material. The Commission has, in addition, seized twenty lorries belonging to an aviation company at Dantzig, which were in the aviation ground at Johannisthal, near Berlin.

SIDE-WINDS

THE Monk Engineering Co. of High Street, Coventry, inform us that they have been appointed agents for the British Lighting and Ignition Co., Ltd., and D.N. Shock Absorbers, formerly known as The Derihon Shock Absorbers for Coventry and District.

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THE Aircraft Disposal Company, Limited, have received from the Royal Aero Club the following appreciation relating to the eight S.E. 5A aeroplanes which were loaned to the Club in connection with the Aerial Derby:—

"These eight machines were a great success in the University Race, and in addition to that two of them took part in the Aerial Derby and also completed the course. This speaks very well for the way in which they were turned out to us, and I am writing to express to your Company our warmest thanks for the trouble your Company took with them."

Of the eight S.E. 5A aeroplanes flown in the "Varsity" Race five completed the full course of 129 miles, and the winning machine continued its flight to arrive home first in the 200-mile Aerial Derby Handicap, although it had to be disqualified. It is worthy of note that all the machines referred to by the Royal Aero Club had been in the Aircraft Disposal Co.'s stores for 2½ years, together with their engines.

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AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder: I.C. = internal combustion; m. = motors. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1917

Published August 4, 1921

5,234. T. A. BATCHELOR and H. E. WIMPERIS. Range-finding apparatus for aircraft. (166,159.)

APPLIED FOR IN 1918

Published August 4, 1921

2,190. CLERGET, BLIN ET CIE. Radial I.C. engines. (166,182.)
4,686. C. J. H. MACKENZIE-KENNEDY. Aeroplanes. (166,184.)
7,577. C. J. H. MACKENZIE-KENNEDY. Apparatus for holding and releasing bombs on aircraft. (166,187.)
16,917. C. J. H. MACKENZIE-KENNEDY. Lifting and controlling surfaces of aircraft. (166,196.)

APPLIED FOR IN 1919

Published August 4, 1921

3,341. H. E. S. HOLT. Parachutes. (166,204.)
3,981. W. H. WATT. Maintaining angle of trim of airship moored to mast. (166,206.)
5,476. J. B. ROZEWSKI. Propellers. (166,207.)
22,267. E. H. FRIEND. Rotary engines. (166,254.)
30,971, 30,972. C. J. H. MACKENZIE-KENNEDY. Apparatus for holding and releasing bombs, etc., on aircraft. (166,281, 166,282.)

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